

LOGIC AND BEAUTY

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Marjorie Senechal. *I Died for Beauty: Dorothy Wrinch and the Cultures of Science*. Oxford and New York: Oxford U. P., 2013. Pp. xii, 300. US\$34.95. ISBN: 978-0199732590.

I

Born in 1894 in Argentina, where her engineer father was then employed, Wrinch was brought up in England. She entered Girton College in (and yet also outside) Cambridge University in 1913 in order to read for the Mathematical Tripos. She passed and indeed took some other courses, but her gender denied her the degree; despite sympathetic colleagues who helped her to develop her obvious talents, the combination of gender bias and her own intellectual competence ensured that much of her career fragmented into a sequence of various short-term appointments, grants and fellowships. It started with a lectureship at University College London from 1918 to 1920, after she had declined an invitation from Karl Pearson in 1916 to join his team there on mathematical statistics. Oxford University came to her aid during the 1920s with part-time posts as mathematical tutor in all five women's colleges; it even awarded her a higher doctorate in 1929, the first to a woman. The presence of G. H. Hardy at the University during this period will have helped her.

Wrinch's research interests were comparably eclectic, making her an excellent candidate biographee; and this book matches the challenge admirably. One reason is that the author knew her personally and worked as research assistant from around 1970; the personal recollections enrich the account considerably. She has used several archives, including Wrinch's own and the Russell Archives, and found valuable information for all parts of Wrinch's life. Wrinch published in a wide range of journals, so that a full bibliography would have been very welcome.¹ The book contains a welcome sprinkling of photographs, mostly portraits, but the publisher has reproduced several of them at the original level of murkiness. They have also followed the common but

¹ The author states that a Wrinch bibliography is on her website (<http://www.marjorie-senechal.com>), but I gather that it is not yet ready.

inefficient modern practice of identifying a chapter only by its title on the pages of the book but only by its chapter number in the endnotes, so that the reader has to detour to the table of contents.

II

The German mathematics abstracting journal *Jahrbuch über die Fortschritte der Mathematik* lists 33 papers by Wrinch between 1916 and 1939.² Several papers treated the potential theory of spheroids and associated special functions; others handled integral equations and the hypergeometric function. Most of this mathematics is applicable, and indeed several papers examined problems in relativity theory, hydrodynamics and fluid dynamics, seismology and aerodynamics.

Some of these papers were prepared under the direction of the Oxford mathematician John Nicholson, supervisor of her higher doctorate in the University of London in 1921, husband in 1922, co-author in 1925, father of her daughter in 1927, but sectioned alcoholic in 1930; she secured a separation order from him that year, and eventually divorced in 1939. In a pseudonymous book *Retreat from parenthood* (1930) she proposed means of supporting mothers in order to avoid the “homes are hell!” that she had experienced herself; Russell tried to secure a US publisher for it.

Several theories involved approximations to mathematical functions, where Wrinch’s co-author of two papers was her father. She also studied asymptotic expansions of a function $f(x)$, divergent infinite inverse power-series in x whose coefficients were determined in a way that led to very accurate calculations of $f(x)$. She was a member of the British Association’s Committee on Mathematical Tables, which put her in close touch with E. H. Neville.

III

The *Jahrbuch* list only partially covers Wrinch’s earliest interests, which included the foundations of mathematics, especially transfinite arithmetic. The influence stemmed from lecturer Bertrand Russell (although mathematical logic did not form part of the Mathematics Tripos), and their contacts continued in London when ex-lecturer Russell was in Brixton jail in 1918 for his anti-war activities; she brought him books and articles for his current writing projects, especially the *Introduction to Mathematical Philosophy* (1919). She also organized his private lecture courses in logic or philosophy in London. She may also have helped Russell with the publication of the second edition of

² This invaluable resource is available at <http://www.emis.de/MATH/JFM>.

Principia Mathematica (1925) by preparing a list of its principal propositions, for she had noted its absence in a letter to Russell. In 1929 she wrote on the logic of relations following the theory of Felix Hausdorff, which had been much admired in *Principia Mathematica*.

Wrinch secured the first publication of Ludwig Wittgenstein's *Tractatus* (not yet so named) in a German philosophical journal in 1921. Much later she joined Russell in rejecting claims that Wittgenstein had not been involved in its first English translation.³

Wrinch also took up some philosophical topics at that time. She handled judgment and memory in a broadly Russellian style. She also worked with Harold Jeffreys on the philosophy of science at this time, emphasizing the role of probability in epistemology but resorting to maximum likelihood rather than to Bayesian principles.

Occasionally Wrinch wrote historically. In 1917 she appraised the mathematics and some of the logic of Bernard Bolzano, at a time when he was little known even in central Europe.⁴ The contact will have come from Russell's former student Philip Jourdain, a historian of mathematics and logic much involved with *The Monist*, where her piece appeared.⁵ After his early death in 1919 she wrote a brief obituary for the London Mathematical Society. Her circle of friends included historians of science George Sarton and the Singers.

IV

The major change of direction in research occurred during the 1920s. Partly under the influence of the teaching of D'Arcy Wentworth Thompson concerning the importance of geometrical form in biology, Wrinch became a pioneer worker in certain aspects of mathematical biology. This interest put her in touch with leading British biologists, such as Joseph Needham, Joseph Woodger, Desmond Bernal and Hal Waddington; she also learned much biology and philosophy when she spent the year 1931–32 in Vienna. She moved to the United States in 1939 with her daughter. In 1941 she secured a research post at Smith College in Northampton, Massachusetts, a leading higher education institution for women. She also acquired her second husband, in 1941: Otto Charles Glaser, a biologist at nearby Amherst College, who died in 1951. In the early 1960s the author enrolled at Smith College and came to work with

³ WRINCH, "Wittgenstein in Red".

⁴ WRINCH, "Bernard Bolzano (1781–1848)";

⁵ WRINCH, "Philip Edward Bertrand Jourdain".

Wrinch, for she included mathematical connections with biology in her own research.

Wrinch proposed a ring-like structure (“cyclols”) for proteins. Her use of Fourier transforms to determine many types of structure in crystals, which excited John von Neumann and Norbert Wiener among others, has been an enduring success; a book of 1946, reprinted in 1966, might have been summarized.⁶ She also developed a theory of “vector maps”, which determined the points that specified the sought structure. As a biologist or biochemist she is best remembered for losing the battle over the character of proteins to Linus Pauling; but she also had distinguished supporters, especially Irving Langmuir.

Wrinch continued to research and teach biology until retirement in 1971, when she moved to Wood’s Hole, Massachusetts until 1975. Her daughter perished in a fire at her own apartment that November; she died of pneumonia in a hospital on 11 February 1976 (curiously, not mentioned here). Her archive was left to the College.

v

Wrinch does not seem to have permitted relations of a non-logical kind that Russell sought of his female companions and co-workers. However, in 1917 she introduced Russell to Dora Black, her best friend from Girton. The subsequent contacts of the trio in the summers of the 1920s down at Porthcurno (where Russell’s house, built as a small hotel, is misdescribed as a “cottage”) made a profound impression. The final sentence in the narrative of this book comes from a letter that she wrote to Dora in 1963: “There has been nothing more beautiful in my life than those days with you and Bertie at Porthcurno.”

⁶ WRINCH, *Fourier Transforms and Structure Factors*. The book does not record any contacts with Russell between 1938 and 1961; but Russell was in the USA at times, and somehow he acquired the first printing of this book and an offprint in it of a paper of 1950 applying Fourier analysis to protein theory.

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